STIENEN
AGRI AUTOMATION

BRAVO TOUCH

Climate control for pig farming

User manual

Table of contents

Copyright and disclaimer

1 About this manual

The manual is intended for the user of this device. It contains all the information necessary for operating and cleaning this product. Please read all information and instructions carefully before using the product.

Symbols mark warnings, important notes, tips, etc. in this manual.

Stienen has compiled this manual with all due care. If you find any errors, please let us know.

1.1 Symbols and definitions


Risk of injury by dangerous electric shock. Danger to people and animals.


Warning indicating danger to product, people and animals if procedures are not strictly complied with.


Warning indicating damage to products if procedures are not strictly complied with.


Pressure cleaning is not allowed.


Collect as separate flows


Important note


Additional information


Example of a concrete application of the functionality described.


Calculation example


Manual control


Tips and advice


Screenshot


Application note

1.2 Customer service

If you have any questions, please contact your installer. Be sure to have all the necessary data handy. You should also always write down the cause of a fault and the circumstances that occurred during the fault. This will enable you to avoid any ambiguities and it will enable your installer to deal with any faults quickly and effectively.

2 Safety instructions and warnings

Read the general safety instructions in this chapter carefully before using the device. A certified installer must install the device and resolve any faults, in accordance with the applicable guidelines. If this product is installed and used in any other way, the warranty will not apply.

2.1 Sound, independent alarm system

Although we have designed and built our control equipment with the greatest care possible, technical faults can never be ruled out. Insurance requirements in many countries are becoming increasingly stringent. This requires the alarm contacts of the various control computers to be connected a central alarm unit.


We recommend also installing a sound independent alarm system, for example a min/max thermostat.


We advise you to manually test the alarm at least once a week.

2.2 During use

The people who operate the device have read the manual carefully. They are aware of potential hazards that may arise from improper use and maintenance of the product.


The device must only be opened by authorised personnel.


Do not switch off the control computer while the house is empty, but switch it to *Off* mode. This will prevent condensation caused by the equipment cooling down.


Check the device for any damage at regular intervals. A damaged device is unsafe. Always report any damage to your installer.


Electronic equipment is splash-proof and must not be cleaned using a pressure cleaner.


If any emergency has occurred, write down: the circumstances under which the emergency occurred, installation settings, software date, software version number and possible causes.

2.3 Disposal

The EU has set up systems for the separate collection of waste electrical and electronic equipment and batteries (Directive 20212/19/EU). If you do not dispose of the device properly, you risk a fine.

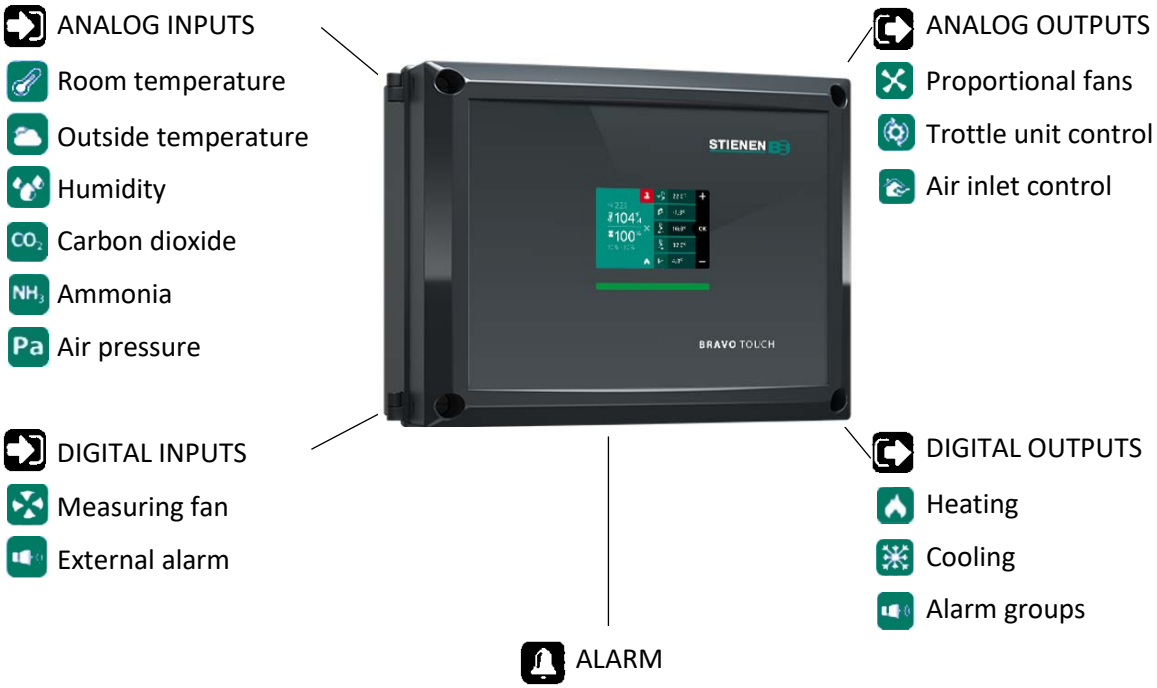

Electrical and electronic equipment must be collected separately at the end of its life.

3 Introduction

3.1 Purpose of use

Equipped with a touchscreen and external connectivity (optional), the BRAVO TOUCH is suitable for controlling all types of ventilation, heating and cooling in today's livestock sector.

3.2 Overview of inputs and outputs



4 Controls

4.1 Outside temperature compensation

When the outside temperature drops below the room temperature, the bandwidth is automatically increased. This process starts when the following conditions are met:

- The outside temperature sensor is activated.
- The measured outside temperature is at least 10°C lower than the room temperature.

The bandwidth increases by 0.1°C for every degree that the outside temperature is below the compensation point, up to a maximum increase of 10°C. For example, with a room temperature of 21°C and an outside temperature of -5°C, compensation begins at 11°C. The bandwidth then increases by (11°C - -5°C) × 0.1 = 1.6°C. If an outside temperature sensor alarm is active, the compensation is automatically deactivated.

4.2 RH control

When the relative humidity (RH) exceeds the setpoint, the minimum ventilation rate is increased. This increase is up to 50% of the set minimum ventilation across a bandwidth of 20% RH.
Note: The control with the highest level of compensation takes priority.

Minimum ventilation	10%
RH setpoint	50%
Measured RH	60%
Bandwidth	20%

Percentage increase calculation: (60% - 50%) / 20% × 50% = 25%
The adjusted minimum ventilation rate becomes: 10% × 1.25 (↑ 25%) = 12.5%.

4.3 CO_2 control

When the CO_2 level exceeds the setpoint, the minimum ventilation rate is increased. This increase can be up to 50% of the set minimum ventilation rate over a range of 1000 ppm CO_2.
Note: The control with the highest compensation has priority.

Minimum ventilation	10%
CO_2 setpoint	1500ppm
Measured CO_2	2000ppm
Bandwidth	1000ppm

Percentage increase calculation: (2000ppm - 1500ppm) / 1000ppm × 50% = 25%
The adjusted minimum ventilation rate becomes: 10% × 1.25 (↑ 25%) = 12.5%.

4.4 NH_3 control

When the NH_3 level exceeds the setpoint, the minimum ventilation rate is increased. This increase can be up to 50% of the set minimum ventilation rate over a range of 10ppm NH_3.
Note: The control with the highest compensation has priority.

Minimum ventilation	10%
NH_3 setpoint	15ppm
Measured NH_3	20ppm
Bandwidth	10ppm

Percentage increase calculation: (20ppm - 15ppm) / 10ppm × 50% = 25%
The adjusted minimum ventilation rate becomes: 10% × 1.25 (↑ 25%) = 12.5%.

4.5 Air inlet control

The air inlet control manages an air inlet with an adjustable temperature correction relative to the setpoint temperature. By applying a bandwidth factor, the actual air inlet bandwidth is determined by multiplying this factor with the ventilation bandwidth. The control operates within a range of 0% to 100%.

4.6 Motor control

The motor control replaces fan control in certain situations, such as when a central duct is used. Motor control can adjust a damper to regulate the air flow into a room continuously. When motor control is active, the fan control automatically switches off, and fan-related settings are hidden. In this configuration, the TRIAC on the BP03 board switches the motor control on and off, while relay 2 on the BP03 controls the motor direction (open or closed). This means that with motor control active, cooling control is deactivated, and heater sensor 2 cannot be used.

Motor control operates either on feedback or time-based control. Feedback-based control provides precise positioning of the motor, while time-controlled operation lacks direct position feedback, which can cause temperature or other parameters to drift gradually. If the motor control is manually adjusted via the Bravo Touch during time-controlled operation, the motor's displayed position may briefly be inaccurate, but this corrects during an 8-hour calibration cycle.

The motor does not continuously adjust its position. After reaching the target position, it pauses for 15 seconds before rechecking its position.

4.7 Ventilation stop control

The ventilation-stop control has three operational modes:

Mode 0 Disables the ventilation-stop control
Mode 1 Enables the ventilation-stop control
Mode 2 Activates a pulse-pause control with an adjustable temperature offset from the setpoint. This mode uses a hysteresis of 1°C and cycles through a 9-minute pause and a 1-minute pulse at minimum ventilation to prevent issues, such as ice buildup slowing down the fans.

In the ventilation-stop state:

- Heating and cooling are turned off.
- Temperature alarms are deactivated (sensor defect alarms remain active).
- RPM feedback control and air intake control stay active.

4.8 Switching the control computer off

When the control computer is turned off, the fan can either stop completely or operate at a set percentage, reflecting the regulation percentage. This ensures the fan runs no less than the minimum ventilation rate and no more than the maximum. The same range applies to inlet control.

Turning off the control computer also:

- Disables heating and cooling functions.
- Deactivates minimum and maximum temperature alarms (sensor defect alarms remain active).
- Keeps air intake control settings visible in standby mode, if applicable.

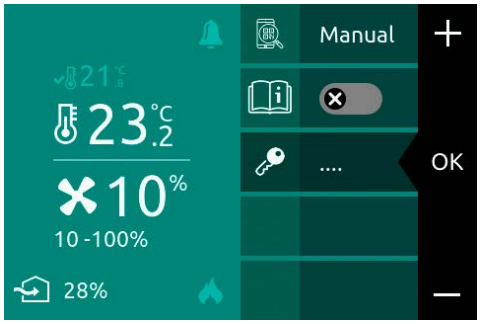
Additionally, the QR code for manual display and access to the installer menu remain available.

4.9 Fan output

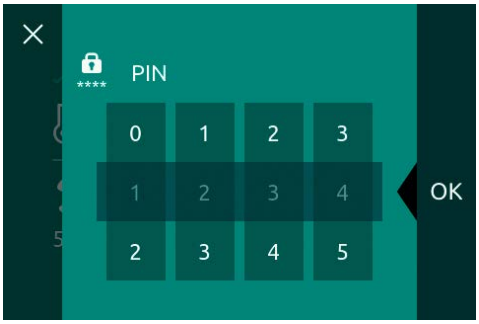
In both operational and standby modes, the fan output remains consistent. For example, if the fan output is set to 15% in operational mode, it will also be 15% in standby mode, with a minimum output of 0.5V.

A menu option allows the fan to output 0V specifically in standby mode. When this option is enabled, the fan output will be 0V in standby. If disabled, the fan output will be at least 0.5V, depending on the set value.

4.10 Login installer menu



Standard



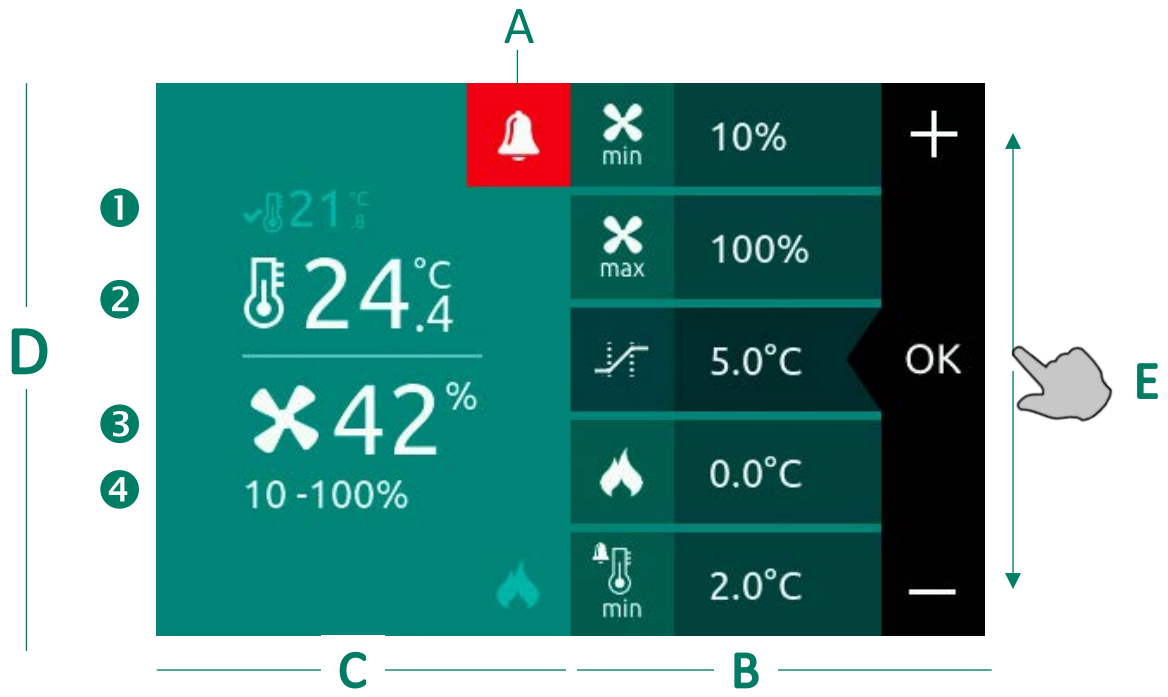
Pin code pop-up screen

There are two ways to access the installer menu:

1. Default method: Use the plus and minus keys in this sequence: plus, minus, minus, plus.
2. Alternative method (PIN Code): This option must be enabled by your installer in the installer menu. Once enabled, a PIN code entry screen will appear when you attempt to access the installer menu. Enter the PIN code set by your installer.

5 Operation

5.1 Screen layout



BRAVO TOUCH screen layout

A Alarm icon. The colour indicates the alarm status:

- Grey: No alarm is active.
- Red: An alarm is active.
- Orange: Alarms have been suppressed but not yet resolved.

B In the right half of the screen, you can swipe up and down to navigate through all control icons. Tapping an icon allows you to change the desired settings (refer to section 5.2 *Changing the settings*). The set values are shown to the right of the icons.

C In the bottom right-hand corner of the screen, if activated, you will see the heating or cooling icon:

- Grey flame ( ): The heating is turned off (heating relay is deactivated)
- White flame ( ): The heating is turned on (heating relay is activated)
- Grey ice crystal ( ): The cooling is turned off (cooling relay is deactivated)
- White ice crystal ( ): The cooling is turned on (cooling relay is activated)

In the bottom left-hand corner, if activated, you will see an additional control icon corresponding to the activated control:

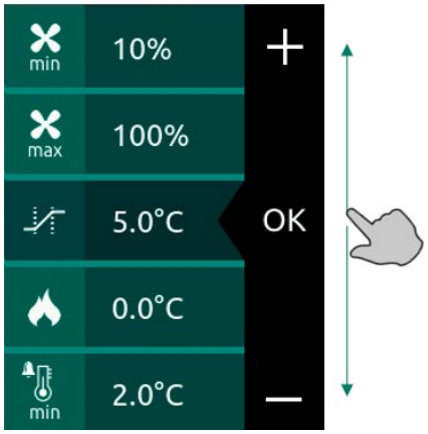
- the position of the additional control in %
- the measured pressure in Pa
- the measured relative humidity in %
- the measured CO_2 content in ppm
- the measured NH_3 content in ppm

D On the left side of the screen is the main overview.

1. Depending on the configuration, you will see the following:
   - *No additional sensor:* Current setpoint temperature.
   - *Outside temperature sensor:* Measured outside temperature.
   - *Additional heating temperature sensor:* Measured temperature for heating.
2. *Current room temperature:* Displayed in degrees Celsius or degrees Fahrenheit.
3. *Current measured ventilation level in %.* If no measuring fan is installed, this will show the calculated ventilation level.
4. *Set minimum-maximum ventilation levels*.

E On the right-hand side of the screen, you will see an overview of all settings with their corresponding values.

5.2 Changing the settings

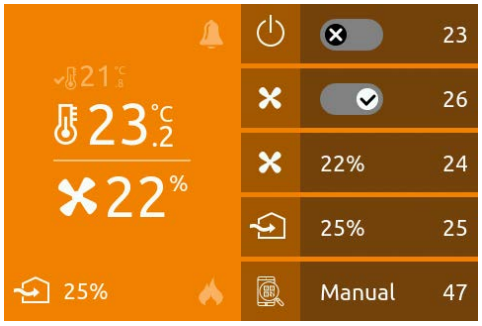


You can change a set value as follows:

1. Tap the icon of the setting you wish to change. A *change bar (+ OK -*) will appear.
2. Tap + or - to increase or decrease the set value.
3. Tap *OK* to confirm the changed value.

If you want to cancel the entered value, do not tap *OK*. Instead, tap anywhere randomly on the left side of the screen. The change bar will disappear, and the setting will return to its original value.

5.3 Turning the control computer on and off



When the control computer is disabled, most options are also turned off. The heating and cooling controls, as well as the minimum and maximum temperature alarms, will be disabled. However, alarms for sensor failures will remain active.

The following options will still be visible:

- Ventilation: Yes/No
- Ventilation %: (if ventilation is set to Yes)
- Air Inlet Control %: (if the inlet option is enabled)
- Service Numbers
- QR Code for Manual
- Login for Installer Menu

For more information, please refer to the description under function number 23, page 15.

6 User menu settings

6.1 Home screen

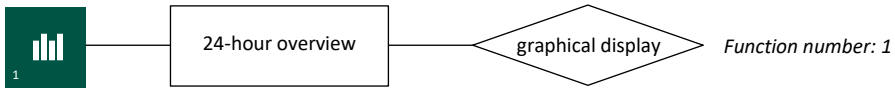
Home screen

This chapter discusses all the settings visible in the user menu, which can be accessed directly from the home screen.

Icons followed by _____ are always visible.
Icons followed by - - - - - - - - - - are visible depending on the settings selected in the installation menu (see installer manual, chapter 5).

Refer to *Appendix A* for a list of function numbers with corresponding dependencies.

6.2 24 -hourly overview

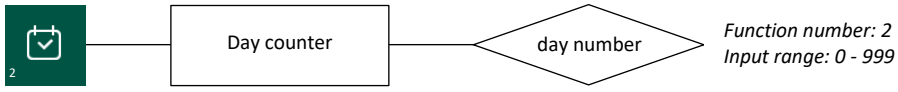


After tapping this icon, a 24-hour graph displaying temperature, ventilation, and additional control opens. You can select different graphs using the icons on the right side of the graph. To close the graph, tap the cross (×) in the top right corner.

Yesterday's measurements are shown with a thin line, while the thicker line represents today's measurements up to the current time.

The extra control graph is only visible when an additional control is enabled.

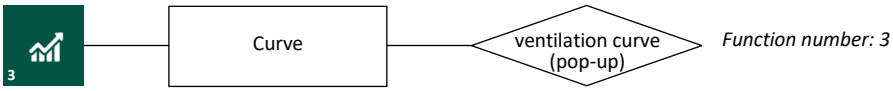
6.3 Day counter



The day counter displays the current day number of a cycle and selects the corresponding values from the ventilation curve. By default, the day counter starts at day 0 and increments by one each day. You can also adjust the day number manually.

The day counter is only visible in curve mode, which can be enabled in the installer menu.

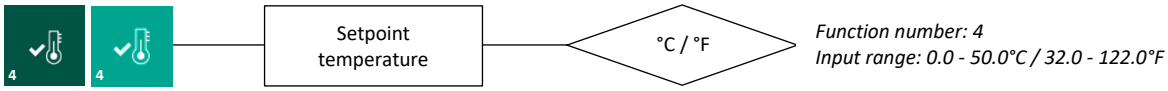
6.4 Ventilation curve



This section allows you to open the ventilation curve.

The ventilation curve is only visible in curve mode, which can be enabled in the installer menu.

6.5 Setpoint temperature

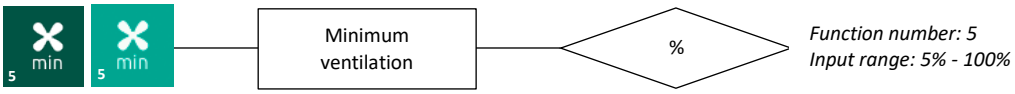


Here, you can set the desired temperature for the room. The unit of temperature is determined by the installer setting (see the installer manual).

If curve mode is enabled, the colour of the icon changes to a lighter green. The calculated value is then displayed and cannot be adjusted directly. Tapping this icon opens the curve menu, where you can change the values (see chapter 7 *Curve mode).*

6.6 Minimum and maximum ventilation

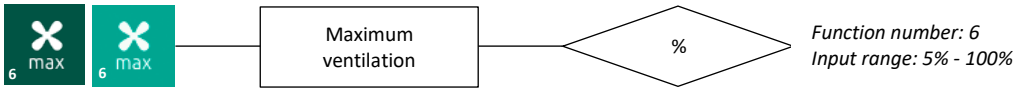
Minimum ventilation



Here, you set the desired minimum ventilation level. This represents the amount of ventilation when the room temperature is equal to or lower than the *setpoint temperature*.

If curve mode is enabled, the colour of the icon changes to a lighter green. The calculated value is then displayed and cannot be adjusted directly. Tapping this icon opens the curve menu, where you can change the values (see chapter 7 *Curve mode).*

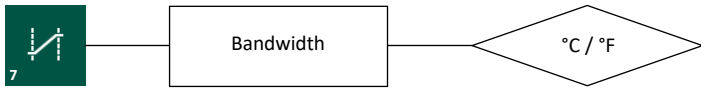
Maximum ventilation



Here you set the desired maximum ventilation. This represents the amount of ventilation applied when the room temperature reaches the upper limit of the bandwidth.

If curve mode is enabled, the colour of the icon changes to a lighter green. The calculated value is then displayed and cannot be adjusted directly. Tapping this icon opens the curve menu, where you can change the values (see chapter 7 *Curve mode).*

6.7 Bandwidth



Function number: 7
Input range: 1.0 - 20.0°C / 33.8 - 68.0°F

Here, you set the desired temperature range in which ventilation increases from the minimum to the maximum level.

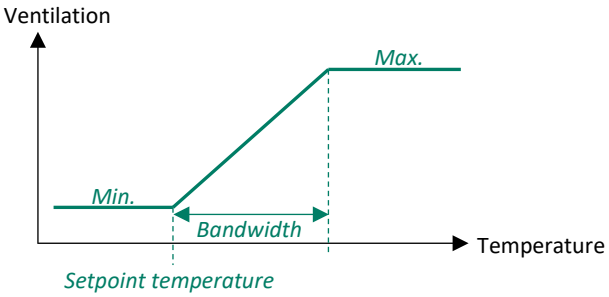
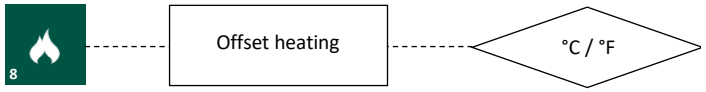


Fig. 1: Bandwidth chart

6.8 Heating control

Here, you set the setpoint temperature for heating control. If you do not use an additional sensor for heating control (Installer setting: function number 54), the heating control is based on an offset from the actual temperature. If you do use a second temperature sensor (User setting: function number 9) for heating control, you will set an absolute setpoint temperature.

Offset heating



Function number: 8
Input range: 0.0 - 10.0°C / 32.0 - 50.0°F

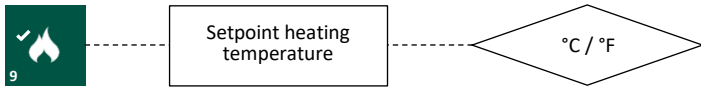
Here, you set the offset for heating relative to the setpoint temperature. The heating relay is energized as soon as the room temperature falls below the set temperature offset.

Setpoint temperature	20,0°C
Offset heating	2,0°C

The heating relay is energised at 20.0°C - 2.0°C = 18.0°C (*room temperature*)

The pictogram is displayed only, if the heating is activated (installer setting: function number 55)

Setpoint heating temperature

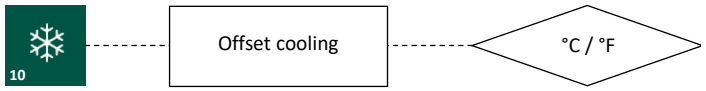


Function number: 9
Input range: 0.0 - 140.0°C / 32.0 - 284.0°F

With additional heating control, the heating is switched on as soon as the second temperature sensor measures a temperature below this set value.

The pictogram is displayed only if heating is activated (installer setting: function number 55) and if a second temperature sensor for heating is enabled (installer setting: function number 54).

6.9 Offset cooling



Function number: 10
Input range: 0.0 - 10.0°C / 32.0 - 50.0°F

Here, you set the offset for cooling relative to the setpoint temperature. The cooling relay is energized as soon as the room temperature exceeds the set offset.

Setpoint temperature	20,0°C
Offset cooling	2,0°C

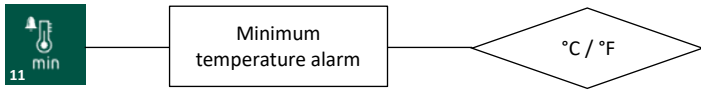
The cooling relay is energised at 20.0°C + 2.0°C = 22.0°C (*room temperature*)

The pictogram is displayed only if cooling is activated (installer setting: function number 57)

In the event of a sensor alarm, the cooling system automatically switches off.

6.10 Minimum and maximum temperature alarms

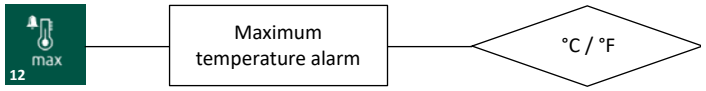
Minimum temperature alarm



Function number: 11
Input range: 2.0 - 50.0°C / 35.6 - 122.0°F

Here, you set the minimum alarm limit for temperature control. When the room temperature drops below this value, the alarm is triggered.

Maximum temperature alarm



Function number: 12
Input range: 2.0 - 50.0°C / 35.6 - 122.0°F

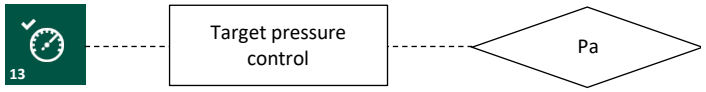
Here you set the maximum alarm limit for temperature control. When the room temperature exceeds this limit, the alarm is triggered.

6.11 Additional controls

Your installer can configure the BRAVO TOUCH with additional controls for pressure, relative humidity (RH), CO_2, or NH_3.

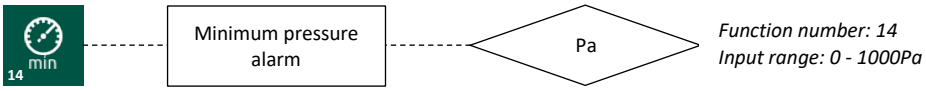
The additional controls are visible in the user menu only if they are activated in the installer menu (see installer manual, chapter 5.21 *Additional control*).

Pressure control

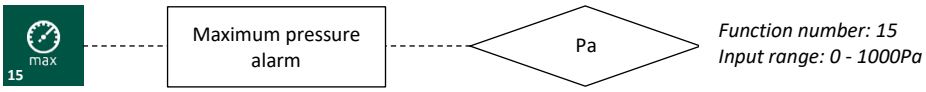


Function number: 13
Input range: 0 - 1000Pa

Here, you set the desired pressure value. The pressure control adjusts the analog output to maintain this set pressure constant.

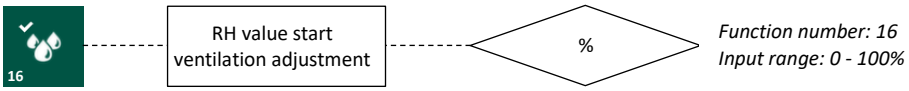


Here you set the minimum alarm limit for pressure control. When the pressure falls below this limit, the alarm is activated.

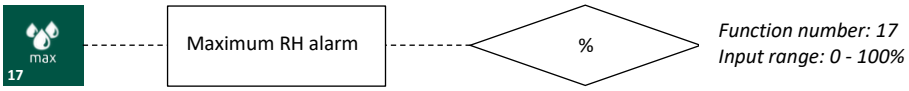


Here you set the maximum alarm limit for pressure control. When the pressure exceeds this limit, the alarm is activated.

Relative Humidity (RH) Control

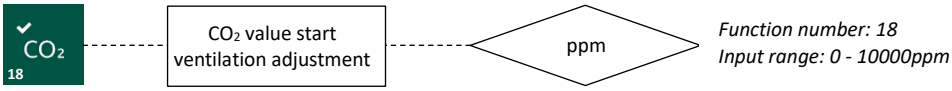


When the relative humidity (RH) rises above the set value, the minimum ventilation is increased to reduce the RH.

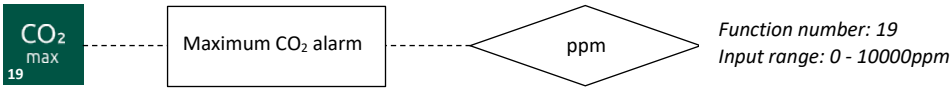


Here you set the maximum alarm limit for humidity control. When the RH exceeds this set maximum value, the alarm is activated.

CO_2 control

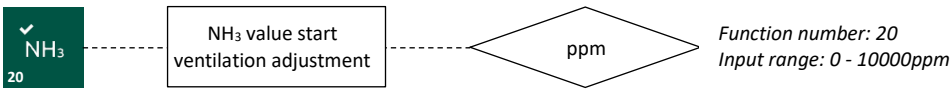


When the CO_2 level rises above the set value, the minimum ventilation is increased to reduce the CO_2 level.

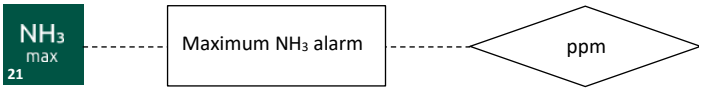


Here you set the maximum alarm limit for the CO_2 control. When the CO_2 level exceeds this set maximum value, the alarm is activated.

NH_3 control



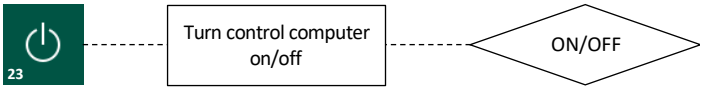
When the NH_3 level rises above the set value, the minimum ventilation is increased to reduce the NH_3 level.



Function number: 21
Input range: 0 - 10000ppm

Here you set the maximum alarm limit for the NH_3 control. When the NH_3 content exceeds this set maximum value, the alarm is activated.

6.12 Turning the control computer on and off

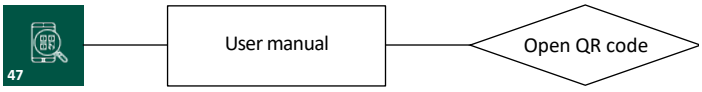


Function number: 23
Input range: enabled - disabled

When the control computer is turned off, the fan can either be completely stopped or operate at a specific percentage. This percentage corresponds to the value used during regulation, ensuring that the ventilation output is not lower than the minimum ventilation and not higher than the maximum ventilation.

When the control computer is switched on, the background color is green, and all functions are active. Upon switching it off, the background color changes to orange. In this state, settings are no longer visible, except for ventilation control, air intake control, manual settings, and function numbers. You can still access the installer program. Heating and cooling (if active), follower control, and temperature alarms are disabled. However, throttling control, speed feedback, and faulty temperature sensor alarms remain active (if selected). If applicable, the position of the inlet control is visible in standby mode

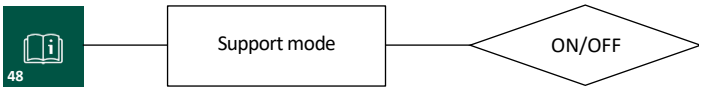
6.13 User manual



Function number: 47

The QR code will open a hyperlink to the digital download version of this manual. You can scan the QR code using your smartphone or other mobile devices.

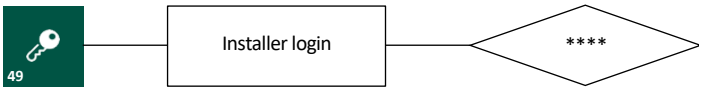
6.14 Support mode



Function number: 48
Input range: ON - OFF

Enable support mode to display function numbers next to each menu option. This feature helps quickly identify remote support functions.

6.15 Installer login

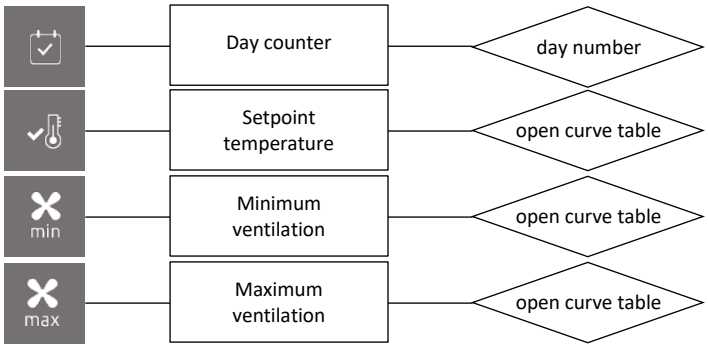


Function number: 49
Input range: - and/or +

Here you can log in to access the installer menu. Your installer has set a 4-digit access code consisting of a combination of pluses and minuses (see installer manual, chapter 5).

7 Curve mode

The curves menu pop-up window displays the ventilation curve settings. Curve mode is enabled in the installer menu. To access it in the user menu, tap the ventilation curve menu item *(function number 3)*.



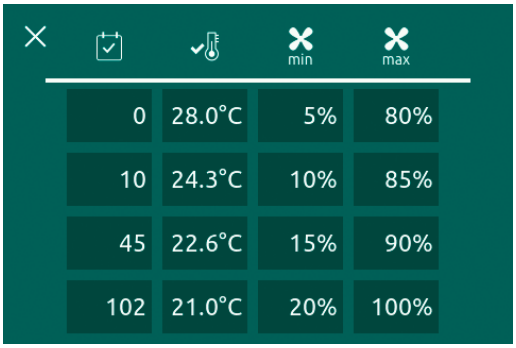


Fig. 2: Curve table

The curve consists of four breakpoints. For each nodal point, you can adjust the setpoint temperature and ventilation values based on the age (in days) of the animals. The transition between the breakpoints is linear over the specified number of days.

Setpoint temperature on day 10	30°C
Setpoint temperature on day 20	20°C

In 10 days, the temperature decreases by 10°C, or 1°C per day.

These settings reflect the measurements according to the defined curve. Selecting a setting opens the curve table.

8 Alarm overview

8.1 General

This chapter discusses the possible alarms of the BRAVO TOUCH.

- **No alarm active**
  the alarm bell icon is grey, it indicates that no alarms are currently active.
- **One or more alarms active**
  If one or more alarms are active, the alarm bell icon flashes against a red background. The display alternates between the alarm bell icon and the respective active alarm icon. Additionally, the alarm relay will deactivate.

8.2 Resolving the alarm situation or silencing the alarm

To deactivate an alarm, tap the alarm icon displayed on the start screen. This action re-energizes the alarm relay. If an alarm is triggered, the relay will drop again.

Once the alarm situation is cleared, the alarm icon changes to grey. If the alarm situation is not resolved, the corresponding icon changes to orange, indicating that the alarm has been suppressed. If the BRAVO TOUCH detects within 5 minutes that the alarm is still active, or if a new alarm situation occurs, the active alarm bell icon will reappear, and the alarm relay will deactivate again.

The various alarm icons are displayed only if the relevant control is active and an alarm condition occurs related to that control.

No alarm
There are currently no alarms active.

Warning
One or more alarms are active but have been suppressed for 5 minutes.

Alarm
One or more alarms are active and the alarm relay has failed.

Minimum temperature alarm
The measured room temperature is equal to or below the set minimum alarm limit.

Maximum temperature alarm
The measured room temperature is equal to or above the set maximum alarm limit.

Ventilation speed feedback alarm
The measured ventilation is significantly below the requested level. During this alarm, the TTM feedback is disabled, and ventilation is controlled based on the calculated value.

Maximum CO_2 alarm
The measured CO_2 level is equal to or exceeds the set maximum alarm limit.

Maximum RH alarm
The measured relative humidity (RH) is equal to or exceeds the set maximum alarm limit.

Maximum NH_3 alarm
The measured NH_3 content is equal to or exceeds the set, maximum alarm limit.

IO alarm
Communication between the lid board and the bottom board has been interrupted.

External input alarm
The external alarm input is active.

Minimum pressure alarm
The measured pressure is equal to or below the set minimum alarm limit.

Maximum pressure alarm
The measured pressure equals or above the set maximum alarm limit.

Sensor-1-defect-alarm
The measured temperature on sensor input 1 is outside the range of -60.0˚C to 130.0˚C. A value lower than -60.0˚C or higher than 130.0˚C indicates a faulty sensor. Space heating and cooling controls are disabled while this alarm is active.

Sensor-2-defect-alarm
The measured temperature on sensor input 2 is out of range. Heating and cooling controls, as well as outside temperature compensation, are disabled while this alarm is active.

Engine control alarm
During calibration, the time taken to go from fully closed to fully open is measured. In operational mode, an alarm is triggered if the desired position is not reached within this time (plus a 10-second margin). The motor control then halts all activity for 150 seconds. After this period, the alarm is cleared, and a new calibration is performed.
Note: A motor alarm can only be activated if feedback is set (see installer manual: *Function number 86*).